

AUSTRALASIAN ANTARCTIC EXPEDITION

1911-14.

UNDER THE LEADERSHIP OF SIR DOUGLAS MAWSON, D.Sc., B.E.

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SCIENTIFIC REPORTS.

SERIES C.—ZOOLOGY AND BOTANY.

VOL. VII. PART 2.

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# THE ALGÆ OF COMMONWEALTH BAY

BY

A. H. S. LUCAS, M.A. OXON., B.Sc., LOND.

WITH NINE PLATES.

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# THE ALGÆ OF COMMONWEALTH BAY.

By <sup>Arthur Murray Rabenhorst</sup> ARTHUR H. S. LUCAS, M.A. Oxon., B.Sc., Lond.

CHLOROPHYCEÆ (Kuetz *ex parte*) Wittrock.

ULVACEÆ (Lamouroux) Rabenhorst.

*Prasiola* C. Agardh.

*Prasiola crispera* (Lightfoot) Agardh.

Many packets of this plant were gathered by Mr. J. G. Hunter, in both winter and summer months, at heights of from 20 to 50 feet above sea-level, in the neighbourhood of Commonwealth Bay.

His records are :—

March 30th, 1912.—Found on soil mainly composed of penguin guano on leeward side of ridge of gneissic rocks, and so protected from S.S.E. blizzard winds, 30 feet above sea-level.

June 21st, 26th, 1912.—Found in crevices of rocks and covered with snow, 20 feet above sea-level.

July 21st, 1912.—Found on an old penguin rookery in crevices of rocks, 40 feet above sea-level.

Dec. 2nd, 1912.—Specimens obtained from moraines 30 feet above sea-level.

Dec. 15th, 1912.—From 30–50 feet above sea-level.

Dec. 21st, 1912.—20 feet above sea-level.

It was also gathered in a locality 120 miles E. of the winter quarters, Adelle Land, by Dr. A. L. McLean.

The stratum of *Prasiola* was a few mm. thick, to 5 or 6 mm. in the dried state, and consisted of many layers of the thalli of the alga. The fronds when examined under the microscope showed great variety of form, from orbicular to long *Stigeonema*-like bands, and were often completely irregular in shape.

The cells before division varied considerably in dimensions, but a good average of them were oblong-quadrangular, about  $11\mu \times 5\mu$ . Kuetzing made a separate species of the Antarctic form obtained by Hooker at Cockburn I., the larger cells  $6\mu$  (about) in diameter, with interspaces wider than the endochrome of the cells. Our dimensions agree better with those of *P. crispera*, and the interspaces are not markedly wide. J. Agardh comments on a difference in habit, *P. antarctica* appearing on moist

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rocks, while *P. crispa* is rarely found to occur on rocks. The specific distinction seems rather trivial, while the difference in habit is perhaps simply due to the fact that if the plant is to grow in Antarctica at all, it must be on rocks or in their crevices. There is no soil proper for them to grow on. *P. crispa* in Europe specially affects moist bare ground impregnated with urine and old thatched roofs. Its appearance in Antarctica on guano seems, therefore, perfectly natural.

Dr. L. Gain in *Deuxième Expédition Antarctique Française, La Flore Algologique*, considers *P. antarctica* as a synonym of *P. crispa*.

(Plate 8, fig. 3, 4.)

*Distribution.*—Widely distributed over Europe and North America, and occurring in the Arctic regions.

In the Southern Seas it has been recorded from the Falkland, South Orkneys, Cockburn I., and was obtained by the Borchgrevink and Shackelton Expeditions from Victoria Land.

Dr. L. Gain (l.c.p. 178), writes of it—“ Abondant dans la région parcourue par le ‘ Pourquoi-Pas ? ’ On le rencontre surtout dans les parties basses, sur les petites îles, sur les rochers, près des Mousses, aux endroits humides où coule l’eau provenant de la fonte des neiges.”—Port Lockroy (île Wiencke) Dec., îles Booth-Wandel, Petermann, Argentine, Jenny, Léonie, Terre de Graham, January to March.

Somewhat extended investigation failed to reveal any other algæ growing with the *Prasiola*. Nothing definite was observed beyond a limited number of species of Infusoria, barbules of penguin feathers and bacteria.

#### CLADOPHORACEÆ (Hassall) Wittrock.

##### *Chætomorpha* Kuetzing.

##### *Chætomorpha Mawsoni*, sp. nov.

Species halophila. Filamentis flaccidis, gregariis, separate adfixis conico basali disco, ad 26 cm. longis: articulis e basi sensim incrassatis; inferioribus cylindraceis, haud ad septa constrictis, diam.  $92\mu$ ; intermediis ovalibus, ad septa constrictis, diametro 3 plo longioribus, e.g.,  $400 \times 139\mu$ ; superioribus sensim magis inflatis, pro ratione latioribus, e.g.,  $570 \times 276\mu$ , dein  $2,000 \times 1,078\mu$ , supremis  $2,000 \times 1,333\mu$ : membrana conspicua; colore (formalin) sordide viridi.

Filaments flaccid, growing together in great numbers, but each provided with a separate conical disc for attachment, and expanding very gradually from base to apex, attaining a length of as much as 26 cm.

Disc conical, diameter of base  $293\mu$ .



Cells above the base cylindrical, not constricted at the joints. In this region the membrane thick and usually frayed. Diameter of cells  $92\mu$ . The cylindrical cells are succeeded by oval oblong cells, constricted at the joints, to nearly three times as long as broad, *e.g.*,  $400 \times 138.6\mu$ . The superior cells more and more inflated, the ratio of the length to the diameter gradually decreasing, *e.g.*,  $570 \times 276\mu$ , higher up  $2,000 \times 1,078\mu$ , while the highest may be 2 mm. long with a breadth of two-thirds or more of the length.

Membrane conspicuous. Colour (in formalin solution) dull green.

This species was obtained in great quantity in Commonwealth Bay by dredging. As I never found it attached to any of the other algæ collected I think it probably grew on rocks or stones at the bottom.

It may be compared with *Ch. clavata* (Ag.) Kuetz from India and South Africa, but the filaments in the latter grow from a large common attachment, and are much coarser at the base ( $750\mu$ ) and are rigid.

The diagnosis of *Ch. coliformis* (Mont.) Kuetz suggests somewhat similar dimensions, but is very meagre. "Filamentis  $750\mu$  ad 2 mm. latis, flaccidis: articulis inflatis, latitudine sesqui- ad subtriplo-longioribus. Hab. ad folia *Zosteræ* epiphytica insulæ Toud (D'Urville) et Tasmaniae."

*Ch. Darwinii* (Hook) Kuetz. is much coarser throughout. It is our common southern form. I have specimens from Tasmania and from Cape Schank, Victoria, in which the upper vesicles attain a diameter of 4 mm. and 5 mm. respectively. *Ch. Darwinii* often appears with several filaments growing near together, but each attached separately to the alga on which it grows.

On the whole it seems best to label the form from Commonwealth Bay, the only locality in which it has been found, as a separate species, conspicuous by the extreme tenuity of the basal tract and the large superior vesicles.

(Plate 4, figs. 1, 2, 3.)

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FUCOIDEÆ (Agardh) *J. Agardh.*

LAMINARIACEÆ (Bory) *Rostafinski.*

*Phyllogigas* Skottsberg.

*Phyllogigas grandifolius* (A. and E. S. Gepp) Skottsberg.

This plant was well represented in the collection by a large number of individuals of different stages from very young to the full-grown plant. The series rendered very evident the scheme of growth.

The frond consists of a flattened axis growing in one plane, terminating in a single lamina and giving off two or three pairs of opposite or approximately opposite branches, each consisting of a flattened stipe and expanded terminal lamina. The central terminal lamina is smaller at first than the laminae of the laterals below it, but finally it grows enormously and may constitute the greater portion of the frond. Not infrequently the lowest branch on the stipes is single, and other unpaired branches may occur at a higher level, but in our plants the prevailing character of the branching is opposite. There is no appearance of dichotomy. The youngest leaves are quite flat, but with growth the margins become more or less undulating.

The complete system of branching is developed at an early stage, and the mature plant is developed by the expansion of the parts thus outlined.

It will be useful to give more detailed description of some of the individuals obtained.

1. This plant, though not the smallest in size, exhibited the simplest stage observed. It was attached to a complex of various growths, the attachment being smothered with *Plocamium coccineum*. The common stipes was 4 cm. long, flattened throughout. From the triangular distal expansion sprang the stipes of the three laminae which constituted the whole frond. Two were lateral and opposite. The third directly continued the primary axis. The whole plant was expanded in the plane of the flattening of the stipes. The lateral stipes were somewhat over 1 cm. long, nearly equal, and flattened in the general plane, without twist. The laminae were unequal, generally ovate-lanceolate, one somewhat falcate, the margins slightly undulate. The longer lamina measured 9.5 cm., while the falcate lamina was shorter. The terminal stipes was shorter than the lateral, the lamina narrower and lanceolate, 8 cm. long. In all the apices were narrowed but obtuse.

(Plate 1, fig. 1.)

In a smaller plant, which, however, exhibits further division of the frond, the attachment of the early stages is seen to consist in a single circle of holdfasts growing out from the stipes.

(Plate 1, fig. 2.)

2. This plant showed further development. The total length was about 54 cm. The common stipes terminated below in a rosette of stout irregular processes (holdfasts) spreading to a radius of 3 cm. At a height of 1.5 cm. sprang a second similar rosette of rather shorter holdfasts. At a height of 5.5 cm. above this second circle sprang the first lateral, single. At 3.75 cm. above this originated a pair of opposite laterals, and at a further height of 5.5 cm. a second pair arose. The

central stipes continued beyond the origin of the upper pair of laterals for about 1 cm., and terminated in a narrow lamina, the smallest of the six. The whole frond was flattened in the one plane. The laminae all had distinct stipels; those of each pair were very unequal. They were broadly or narrowly lanceolate, the laterals very obtuse.

It is evident that the terminal lamina is the youngest, and that the growth is acropetal.

(Plate 2.)

3. Our third example justified the generic and specific names. It consisted of a clump of twenty-one plants. At first sight it seemed as if they were growing from a common attachment, a solid basal mass of about 13 cm. diameter, and height of 7.5 cm., but it was soon evident that the several plants could be easily parted, and that the basal mass consisted of the bases of the several plants united together by the intergrowing and mutual attachment of the leathery holdfasts springing from each of them. The longest frond attained a length of 213 cm., with a diameter of 3.125 cm. at the base. This plant bore three alternate laterals before it terminated in the apical lamina. This lamina was 57.5 cm. long, with a maximum diameter of 32.5 cm. Other laminae attained the length of 132 cm., with maximum width 23.75 cm., and 140 cm. with maximum width 31.25. In this older form the undulation of the laminae was marked. Practically the mature plant is seen to be as it were merely an enlargement of a quite early stage. Also our series fully justifies Skottsberg's view that *Phyllogigas* is characteristically a Laminarian in its external form.

One fragment showed a marked variation in the outline of the lamina. It consisted of a portion of a flat stipes (about 10 cm. present), which expanded into an apparently orbicular lamina. The margin was incomplete, but the length of the frond was clearly reduced, while the width was remarkably extended.

(Plate 3.)

Unfortunately, in none of our specimens could any appearance be detected of organs of reproduction.

The structure of *Phyllogigas* is well illustrated by A. and E. S. Gepp, who first described [it see National Antarctic Expedition, "Discovery," vol. iii, 1907, for full details]. Additional figures are given by Skottsberg, Swedish Expedition, "Antarctica," Phæophyceen, 1907.

*Distribution.*—*Phyllogigas* has a wide range in Antarctic Seas. It was obtained by the "Antarctica," from both South Georgia and near Graham Land, and by the "Discovery," at Cape Adare and Coulmein Island in Victoria Land. Fragments were dredged by the "Pourquoi Pas?" at a depth of 40 m. near Weincke I. Thus Commonwealth Bay furnishes an intermediate locality. This Laminarian grows in Commonwealth Bay abundantly, at depths of from 10 to 40 metres.

DESMARESTIACEÆ (Thuret) *Kjellman*.*Desmarestia* Lamouroux.

*Desmarestia compressa* (Reinsch) Skottsberg=*D. Harveyana* Gepp.

Various fragments and one handsome specimen nearly 6 feet long.

Fully figured by A. and E. S. Gepp, with detailed structure, National Antarctic Expedition, "Discovery," Natural History, vol. iii, Skottsberg, "Antarctica" Phæophyceen, gives a photograph of an entire plant showing the attachment.

*Distribution*.—South Georgia, South Shetlands (Deception, King George); Cockburn I, Gerlache Sts., Booth-Wandel, Petermann and Argentine Islands; Kerguelen; Cape Adare and Coulmein Is., Victoria Land. Commonwealth Bay is again an intermediate station.

The species is sublittoral in its habitat. Thus L. Gain, Second French Expedition, "Pourquoi Pas?" La Flore Algologique, p. 38, writes, "Le *D. compressa* est très commun dans toute la région ouest de la terre Louis-Philippe et de la terre de Graham, où il forme une zone caractéristique assez loin au dessous du niveau des basses mers." And Skottsberg, l.c. p. 19, "Auf Fels-und Stein-grund der sublitorales Region bis zu ihrer untersten Grenze (etwa 40 m.), ausnahmsweise kleine Exemplare in Tümpeln des Gezeitensgebiets."

ECTOCARPACEÆ (Agardh) *Kuetzing*.*Geminocarpus* Skottsberg.

*Geminocarpus geminatus* (Hooker fil. and Harvey) Skottsberg.

Plants were found growing attached to *Plocamium coccineum*. Typical form showing plurilocular sporangia.

*Distribution*.—Southern South America (Hooker, Hariot, Skottsberg), Falkland I. (Hooker, Skottsberg), South Georgia (Skottsberg), Booth-Wandel (Turquet), Petermann I. (L. Gain), Kerguelen, Cape Adare, Victoria Land. It also occurred in the material collected by the Mawson Expedition at Macquarie Island.

FLORIDEÆ *Lamouroux*.GIGARTINACEÆ *Schmitz*.GIGARTINEÆ *J. Agardh*.IRIDÆA *Bory*.

*Iridæa cordata* (Turner) J. Ag.

Dr. L. Gain, "La Flore Algologique des Régions Antarctiques et Subantarctiques," pp. 55-57, demonstrates the identity of the southern *I. micans* Bory with the northern *I. cordata* Turner, and justifies the inclusion in *I. cordata* of the forms described as

distinct species—*I. dichotoma* Hooker and Harvey, *I. undulosa* Bory, *I. crispata* Bory, *I. Augustinæ* Bory, *I. ciliata* Kuetzing, and with less certainty, *I. obovata* Kuetzing, *I. dentata* Kuetzing, and *I. capensis* J. Ag.

Two specimens from Commonwealth Bay come well under the description of *I. cordata*. The general outline is cordate sub-reniform and the margins lack marginal teeth and cilia.

The larger plant measures 14 cm. in length and 15 cm. in width, eminently cordate above the conspicuous stipes, which is flat, not at all canaliculate.

The smaller plant measures 9 cm. in length and about 7 cm. in width, and has not yet developed the cordate form at the base above the conspicuous stipes, which is also flat, though the margins show a tendency to fold over below. Length of stipes 1 cm.

*Iridæa Mawsoni* sp. nov.

Two plants with the structure of *Iridæa* which were obtained at Commonwealth Bay do not seem to be capable of being included under the most general description of *I. cordata*. They are not at all cordate. The following description is given from the larger plant, or more strictly, group of plants.

Fronde a disco radicali gregariæ, ad 17 cm. longæ, breviter stipitatae, juniores lineares, adultiores subpalmatae. Stipes angustus, mox cuneatim vel flabellatim in laminam ad 5 cm. latam expansus, ex qua crescunt laciniae (vel potius segmenta) pauciores, ad sex notatae. Laciniae late lanceolatae, rotundatis sinibus divergentes, plerumque apud basim constructae, in acumen obtusum maxime distinguendum productae. Margines laciniarum leniter undulati, ut solet integri raro parvis excrescentibus interrupti. Laminæ crassæ, primo planæ mox ancipites, ultimo cavæ. Substantia gelatinoso-carnosa. Stratum frondis interius cellulis constat cylindraceis et multangulatis angulis porrectis cylindraceis cum vicinis anastomosantibus, omnibus reticulum laxissimum in medio laxius formantibus. Stratum subexternum cellulis angulatis in paucas series parallelas ad marginem, cylindraceis filis etiam anastomosantibus. Stratum externum filis moniliformibus, articulatis cellulis rotundioribus, dichotomo-fastigiatis, ab subexterno strato verticaliter exeuntibus, mucosolidescente cohibitis, constituitur.

Color rubro-purpureus. Cystocarpia et tetrasporangia ignota.

Fronde gregarious from a radical disc, each shortly stipitate, extending to a maximum length of 17 cm., the younger linear entire, the older subpalmately divided. Stipes narrow, soon diverging into a broad lamina to 5 cm. wide. From this arise a small number, to 6 noted, of segments or laciniae. Laciniae broadly lanceolate, separated by rounded sinuses, generally narrower at the base and terminated rather abruptly by a very conspicuous obtuse acumen. Margins of the laciniae moderately undulate, for the most part entire, occasionally interrupted by small outgrowths. Laminæ thick, at first flat, but soon convex, finally hollow. Substance gelatino-carnose.

Structure.—The interior stratum of the frond consists of cylindrical and many-angled cells, the angles produced into threads which anastomose with those of neighbouring cells, and form a loose network, looser in the centre. A sub-external stratum consists of angular cells grouped in series parallel to the surface of the frond and anastomosing with cells of the small and of adjacent series. The external stratum is formed of small rounded cells arranged in dichotomous-fastigiate series perpendicular to the surface, the cells held together in quasi filaments by a firm mucus.

Colour reddish-purple. No cystocarps or tetrasporangia observed.

(Plate 5. Plate 9, fig. 3).

TYLOCARPEÆ *Kuetzing*.

*Phyllophora* Greville.

*Phyllophora antarctica* A. and E. S. Gepp.

Many examples of this species were dredged at a depth of 45–50 fathoms in Commonwealth Bay. Some were growing on worm tubes and sponges, but most had been detached by the dredge. They were of the form and structure of the plants described by A. and E. S. Gepp, National Antarctic Expedition, 1901–1904, Marine Algæ, p. 12, Pl. IV, fig. 21, 22. Our largest specimen measured about 9 cm. in length. I could not find fruits of either kind.

*Distribution*.—Hitherto only recorded from off Cape Wadsworth, Coulmein I., Victoria Land.

CALLYMENIÆ (J. Ag.) *Schmitz*.

*Callymenia* J. Agardh.

*Callymenia antarctica* Hariot.

This alga was described by Hariot from a single specimen obtained by the First French Antarctic Expedition, Ile Booth Wandel, dredged at 30 metres depth.

His description is “Frondes numerosæ lapidibus ima basi adfixæ, cæspitem emulantes, aliæ vix evolutæ, alteræ ad 20 cm. altæ, longe cuneatæ et late deltoideæ, margine integræ, apice sat profunde fere ad medium plurieslaciniato divisæ. Fructus ignoti. Facies Rhodymeniæ, structuræ Callymeniæ.”

Dr. L. Gain records also a single specimen, not well preserved, which was gathered in a dredging at 30 metres in the Peltier Channel, near Ile Wiencke, by the “Pourquoi Pas?”

It is with some hesitation that I ascribe to this species a *Callymenia* dredged by the Mawson Expedition at 60 fathoms in lat. 65° 42' S., long. 92° 10' E. Several

examples were preserved which vary greatly in the general outline of the frond, some much lacinated, others, as in the figure, much less so. Some fronds were sterile, others bore cystocarps. The cystocarps and structure of the frond are characteristic of *Callymenia*.

(Plate 6, figs. 1, 2, 3.)

SPHÆROCOCCACEÆ (Dumont) Schmidt.

GRACILARIÆ (Naegeli) J. Agardh.

*Gracilaria* Greville.

*Gracilaria simplex* Gepp.

Evidently abundant on the station. A large number of examples were collected some simple, and others showing most of the complex growths depicted by L. Gain, Charcot Expédition, La Flore Algologique, Plate VI.

*Distribution*.—South Orkneys, Deception I., Islands Wiencke, Booth-Wandel, Petermann, and off Cape Wadsworth, Coulmein I., Victoria Land.

(Plate 9, fig. 1, 2.)

*Plocamium* Lamouroux.

*Plocamium coccineum* (Hudson) Lyngbye.

Evidently abundant in the locality. A young plant of *Phyllogigas* was collected (presumably dredged) with the attachment smothered in *Plocamium*. Others were growing with or on *Iridæa* and *Gracilaria*, but most of the samples collected were unattached.

I failed to see cystocarps. Apparently these are rarely met with in the southern regions. Figures are given (Pl. 7, *a*, *b*) of the stichidia. Zonate division was obscure in the tetrasporangia, which were probably not mature.

All European workers on Antarctic algæ have identified the prevailing *Plocamium* as *P. coccineum*. De Toni, Sylloge IV, pp. 590, 591, apparently would restrict *P. coccineum* to Atlantic forms. He says, "Specimina collecta in oceano australi ad littora Americæ, Africæ, Tasmaniæ, Novæ Zealandiæ-aptius *Plocamio leptophyllo* videntur adscribenda." He previously describes *P. leptophyllum* Kuetz. as the normal Tasmanian and Australian form.

The Australasian species, common in Tasmania and Victorian seas, extends along the New South Wales coast to the north of Sydney. In Southern Queensland and Norfolk Island its place is taken by *P. hamatum*.

In order to make a comparison of the two forms, it will be convenient to show the descriptions as given by De Toni in parallel columns. The points of apparent difference are in italics (ours).

<i>P. leptophyllum.</i>	<i>P. coccineum.</i>
<p>Fronde anguste lineari, ecostata, decompositopinnata, pinnis alterne 3-5, omnibus angustissimis a basi latiore longe acuminatis, infima simplici nunc recurvata et subcircinatim revoluta, laciniis superiorum rectis subulatis integerrimis;</p> <p>Sporophyllis secus margines seriatis supra stipitem <i>longiorem</i> lanceolatis simpliciusculis, infra apicem <i>apiculo unilaterali aut duobus oppositis brevioribus suberuciatis</i>, duplici serie tetrasporangia monstrantibus.</p>	<p>Fronde anguste lineari, ecostata, decompositopinnata, pinnis alterne ternis vel quaternis, (Conf. var. <i>uncinatum</i> J. Ag.) inferiori laciniisque superiorum a basi <i>parum latiore</i> acuminatis subulatis integerrimis;</p> <p>Sporophyllis singulis supra stipitem lanceolatis simpliciusculis, aut infra apicem <i>in apiculos paucos</i> abeuntibus, duplici serie tetrasporangia monstrantibus.</p>

For comparison I have figured sporophylls of a plant collected at Eden in the south of New South Wales, near the Victorian border. The sporophylls occur normally in threes, and are evidently transformed pinnules of various orders. (Plate 7, c, d.)

Some are simply forked, others simple with one unilateral apiculus, others show the cruciate form, while in the rough sketch of another sporophyll from the same plant the branching is seen to be extremely complex—so as to diverge widely from Kuetzing's description in *P. leptophyllum*.

The length of the pedicels of the sporophylls varies a good deal, but whatever variation occurs in the Antarctic form occurs as freely in the Australian. The number of the pinnæ, 3-5 in *P. leptophyllum* and 3 or 4 in *P. coccineum*, is not of value as a constant character. I have plants I gathered off the Isle of Wight, England, in which there are several series of 5 pinnæ. The base of the primary pinnæ is wide in both forms, the base of the sporophylls usually narrow.

My conclusion is that the Australian *P. leptophyllum* is identical with the Antarctic form, and I can see no valid reasons for separating either from *P. coccineum*.

DELESSERIACEÆ (Naegeli) Schmitz.

*Schizoneura* J. Ag.

*Schizoneura quercifolia* (Bory) J. Ag.

= *Delesseria quercifolia* Bory, Voyage de la Coquille, Atlas Cryptogams, Pl. 18.

A number of plants were dredged by the collectors of the Mawson Expedition at a depth of 60 fathoms in lat. 65° 42' S., long. 92° 10' E., on 21st January, 1914. They were growing attached to stouter Floridææ.



The fronds varied in length from 7 cm. to 18 cm. Unfortunately, all were sterile. The growth of the frond follows the growth of the branching axis. The main "costa" may persist to the extremity of the frond, giving out opposite, or approximately opposite, "veins" at distances which increase as the part of the frond grows older. As growth proceeds, costa and veins increase in length in a somewhat sinuous course, the lamina not keeping pace with them. Thus the frond becomes lobed and takes on the oak-leaf form. The veins give out secondary veins in the same way. At certain points on the primary veins the lamina may be so much reduced, or be actually denuded, so that the lobe becomes a pinna. The general outline of a young frond or young pinna is roughly oval. Then appear in order of growth sinuations, lobes, pinnae or pinnulae. Thus the originally simple frond may become bi- or tri-pinnate. The lamina of the main axis becomes denuded at the base with age, and thus an apparent stipes appears.

Occasionally the main costa forks, and forms two equal branches, which develop in the normal manner. (Plate 8, figs. 1, 2.)

*Distribution.*—North Pacific, Falkland I., Cape Horn, Ile Petermann ("Pourquoi Pas?"), Hermite I., Kerguelen, off Cape Wadsworth, Coulmein I. ("Discovery").

#### CERAMIACEÆ (Bonnemaison) *Naegeli*.

##### *Bornetia* Thuret.

*Bornetia* (?) *antarctica* (Hooker and Harvey) De Toni = *Griffithsia antarctica* Hooker and Harvey.

A single incomplete sterile filament was preserved which seems to belong to this species.

It measured 5 cm. in length, and consisted in a chain of almost cylindrical cells, tapering at each end to the narrow constriction between the articuli. Each articulus was about 2 mm. long and .45 mm. wide, the dividing septa about .11 mm. wide. This agrees with the description given by De Toni, *Sylloge* IV, p. 1297, though the material is too meagre to enable me to speak with certainty.

Distribution of *Griffithsia antarctica* as given by De Toni :—Rocks at Cape Horn, Hermite, Kerguelen, and Falkland Islands. Doubtfully identical the plants from Tasmania and New Zealand.

##### *Ballia* Harvey.

##### *Ballia callitricha* (Agardh) Montagne.

Sparingly represented by worn fragments. One small fragment was present in the haul obtained by the dredge in 45–50 fathoms.

The form in every case was that described as *Ballia Hombroniana* by Montagne.

*Distribution.*—Patagonia, Magellan Straits, Cape Horn, Terre des États, South Georgia, Petermann I., Falkland I., Crozet, Kerguelen, Auckland I, New Zealand, Tasmania, and the South and South-west coasts of Australia. (I have not met with it on the East coast of Australia.)

This will then be the first record of the plant in the waters immediately surrounding the Antarctic Continent.

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ANTARCTIC MARINE ALGÆ COLLECTED BY THE MAWSON  
EXPEDITION.

CHLOROPHYCEÆ.

*Prasiola crispa* (Lightf.) Menegh.

\**Chaetomorpha Mawsoni* sp. nov.

PHÆOPHYCEÆ.

*Geminocarpus geminatus* (Hook. and Harv.) Skottsberg.

*Phyllogigas grandifolius* (Gepp) Skottsberg.

*Desmarestia compressa* (Reinsch) Skottsberg.

FLORIDEÆ.

*Iridæa cordata* (Turn.) J.Ag.

\**Iridæa Mawsoni* sp. nov.

*Phyllophora antarctica* Gepp.

*Callymenia antarctica* Hariot.

*Gracilaria simplex* A. and E. S. Gepp.

*Plocamium coccineum* Lyngbye.

*Schizoneura quercifolia* (Bory) J.Ag.

*Bornetia* (?) *antarctica* (Hook. and Harv.) De Toni.

*Ballia callitricha* (Ag.) Mont. Form *B. Hombroniana* Mont.

The two species marked by an asterisk are considered to be new to science. *Ballia callitricha* has not as yet been found on the Eastern Antarctic coast, and very probably does not grow there. The other algæ are all previously-recorded Antarctic forms.

The algæ collected by the "Discovery" Expedition from Victoria Land naturally come into comparison with the algal flora of Commonwealth Bay. A. and E. S. Gepp

studied the Victoria Land forms, and in their description enumerated eleven fully-named species, while Foslie described a calcareous alga. The list includes

*Geminocarpus geminatus* (Hook. and Harv.) Skottsb.

*Desmarestia compressa* (Reinsch.) Skottsb.

*Lessonia simulans* Gepp.

*Phyllogigas grandifolius* (Gepp) Skottsb.

*Iridaea cordata* (Turn.) J. Ag.

*Phyllophora antarctica* Gepp.

*Gracilaria simplex* Gepp.

*G. dumontioides* (Harv.) Gepp.

*Plocamium coccineum* Lyngb.

*Delesseria quercifolia* Bory.

*Spongoclonium orthocladum* Gepp.

*Lithothamnion coulmanicum* Fosl.

A *Zonaria* and a third *Gracilaria* were not definitely identified. Thus eight species are known as common to both Victoria Land and Commonwealth Bay. Six species were found in Commonwealth Bay which were not noted in Victoria Land, and as many, including the not fully determined forms, were found on the coasts of Victoria Land and were not noted in Commonwealth Bay. It seems, on present evidence, that the algal flora in both regions is very limited in number of species. The majority of species are common to the two; others may really be so, but it seems not unlikely that the prevailing currents flowing east have aided in the conveyance of more kinds to the more westerly region.

#### DESCRIPTION OF THE PLATES.

##### PLATE 1.

Fig. 1. *Phyllogigas grandifolius*. Stage 1.

Fig. 2. *Phyllogigas grandifolius*. Young plant showing attachment.

##### PLATE 2.

*Phyllogigas grandifolius*. Stage 2.

##### PLATE 3.

*Phyllogigas grandifolius*. Forms of the terminal segment.

##### PLATE 4.

*Chatomorpha Mawsoni*.

Fig. 1. Single filament, natural size.  
Figs. 2, 3. Upper and lower cells.

##### PLATE 5.

*Iridaea Mawsoni*.

##### PLATE 6.

*Callymenia antarctica*.

Fig. 1. Sterile plant, natural size.

##### PLATE 6.—continued.

Fig. 2. Frond bearing *cystocarps*, natural size.

Fig. 3. Cross-section of frond.

##### PLATE 7.

*Plocamium coccineum*.

Figs. a, b, from Commonwealth Bay.

Figs. c, d, from Eden, New South Wales.

##### PLATE 8.

Figs. 1, 2. *Schizoneura quercifolia*, natural size.

Figs. 3, 4. *Prasiola crispa*, much magnified.

##### PLATE 9.

Fig. 1. *Gracilaria simplex*, natural size.

Fig. 2. Cross-section of frond of *Gracilaria simplex*.

Fig. 3. Cross-section of frond of *Iridaea Mawsoni*.

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*both nat. size.*

2





*1/25 nat. size*







1  
1/2 nat size.









*45 nat. size.*





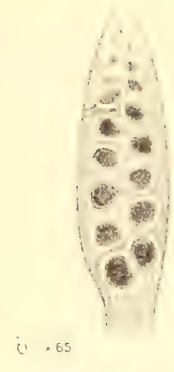
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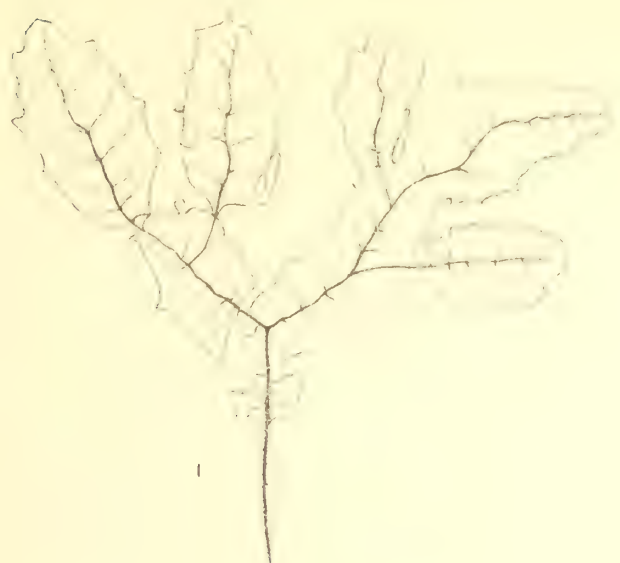




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1



3



5





3

2



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